

**REMARKS**

In the Official Action, the Examiner rejected claims 1, 2, 4-7 and 10-13 under 35 U.S.C. §102(b), as allegedly being anticipated by JP 2001-220441. The Examiner then rejected remaining claims 3, 8, 9 and 14 under 35 U.S.C. §103(a) as allegedly being unpatentable over the JP '441 Publication.

Applicant respectfully submits that neither of the rejections set forth in the Official Action are proper based on a complete understanding of the present invention and the evidence of record, including the Examples and Comparative Examples provided in the specification and the additional Comparative Example provided in the attached Declaration.<sup>1</sup>

As explained in greater detail in the specification and recited in claim 1, one aspect of the present invention involves a flame-retardant polyamide composition which comprises 10-80% by mass of a polyamide (A), 5-40% by mass of a flame retardant (B), 0.5-10% by mass of zinc borate and at least one other salt of zinc (C), 0-60% by mass of an inorganic reinforcing material (D), and 0-5% by mass of a drip preventing agent (E). Other aspects of the present invention are set forth in the dependent claims.

By following the teachings of the present invention, one can obtain a flame-retardant composition which generates little or no bromine gas, has excellent flame retardency, toughness and melt fluidity, as well as good heat resistance and color stability in the reflow soldering step required in surface mounting technology. Such advantageous results are illustrated in Examples 1-7 in Table 1 on pages 28 and 29 of the specification. In contrast, when the zinc borate and at least one other salt of

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<sup>1</sup> The Declaration is being submitted in unexecuted form. The executed Declaration will be submitted in the near future.

zinc is completely absent, as in Comparative Example 1, or when the zinc borate is present, but the at least one other salt of zinc is absent, as in Comparative Example 2, or when the zinc borate is absent, but another of zinc salt is present, as in Comparative Examples 3-5, substantially inferior results occur. In this respect, it will be noted that the total amount of zinc compounds used in Comparative Examples 2-5 is the same total amount used in illustrative Examples 1-6. To further demonstrate the advantages of the present invention over compositions which do not contain the defined components, attached hereto is a Declaration Under 37 C.F.R. §1.132 which sets forth an additional Comparative Example which uses a combination of zinc phosphate and calcium zinc molybdate, but which does not contain zinc borate.

With the foregoing discussion in mind, applicant respectfully maintains that the JP '441 Publication does not provide a proper basis for an anticipation rejection and also cannot be relied on for an obviousness rejection, particularly in view of the technical evidence that has been made of record. The JP '441 Publication provides a combustion-resistant polyamide composition. As the Examiner has noted, the composition described in paragraph [0010] includes (A) 20-80 wt% of aromatic polyamide with a melting point of 290°C or more, (B) 0-60 wt% of inorganic reinforcing material, (C) 5-40 wt% of bromine combustion-resisting agent, and (D) 0.1-10 wt% of one or more kinds of compounds selected from compound oxides containing zinc and zinc salts of phosphoric acid with the total amount being 100 wt%. The compound oxides containing zinc and zinc salts are set forth in paragraph [0038] and include a number of different compounds. The compounds include oxides of zinc combined with elements of Group 13 or 14 of the periodic table with boron, aluminum, gallium, thallium, carbon, silicon, germanium, tin and lead being

specifically mentioned. This paragraph also mentions zinc salts of molybdate or tungstenate. While zinc borates are identified, the paragraph continues by stating that it is also possible to use zinc salts of molybdic acid or tungstic acid with calcium, zinc molybdate, alkaline zinc molybdate and compounds of high-efficiency zinc molybdate and magnesium silicate being mentioned. Indeed, the JP '411 Publication only discloses the use of at least one selected from complex oxides which contain zinc and zinc phosphate. However, the compositions of Examples 1 and 3 only contain zinc borate and those of Examples 2 and 4 only contain zinc stannate.

The JP '441 Publication does not describe every element of the claim. There is absolutely no disclosure to use a combination of zinc borate and at least one other salt of zinc which is specifically recited in claim 1 of the present application. Instead, the JP '441 Publication teaches a variety of zinc compounds which can be used without any guidance that mixtures are important, much less mixtures of zinc borate and at least one other salt of zinc. The JP '441 Publication especially does not disclose or suggest that color stability can be attained in accordance with the present invention.

The importance of the specifically recited combination of zinc borate and at least one other salt of zinc has been set forth in the specification and the aforementioned results provided in Table 1. Described more specifically, Comparative Examples 2 to 5 show the results of compositions containing only one zinc salt, and these Comparative Examples are consistent with the teachings of the JP '411 Publication. The composition of Comparative Example 2, which contains only zinc borate as zinc salt, shows poor color stability (serious color change). The composition of Comparative Example 3, which contains only zinc phosphate as zinc

salt, shows bad flame retardancy of UL-94 (V-1). The composition of Comparative Example 4, which contains only zinc stannate as zinc salt, shows bad color stability (serious color change). The composition of Comparative Example 5, which contains only calcium zinc molybdate as zinc salt, shows bad flame retardancy of UL-94 (V-2). Such Comparative Examples show that in the case of using only one zinc salt, a composition having both excellent flame retardancy and color stability is not obtained.

The evidence of record also refutes any possible contention that the claims are obvious from the teachings of the JP '441 Publication. The publication does not recognize that by using a combination of zinc borate and at least one other salt of zinc in accordance with the present invention, one can obtain the advantageous properties illustrated in the evidence of record. This includes an acceptable reflow heat resistant temperature in addition to flammability resistance and color stability.

The aforementioned Declaration provides an additional Comparative Example which shows that the combination of zinc phosphate and calcium zinc molybdate materials within the description provided in paragraph [0038] of the JP '441 Publication do not provide the same results that can be obtained in accordance with the present invention. The additional Comparative Example can be compared with illustrative Examples 4 to 6 from the present application which have the same composition ratio of Polyamide (A) and Flame retardant (B). On analyzing the results, it can be understood that the Flammability Evaluation of UL 94 in Examples 4 to 6 are V-O. On the other hand, the additional Comparative Example is V-2. Also, with respect to the Flammability Evaluation of flammable combustion times, Examples 4 to 6 are longer than the additional Comparative Example. Thus, the

composition of the present invention has superior flame retardancy compared to the additional Comparative Example. Furthermore, the bending strengths and reflow resistant temperatures of Examples 4 to 6 are higher than those of the additional Comparative Example which illustrates the superior toughness and heat resistance relative to the additional Comparative Example.

In view of the subject matter defined in the claims and the evidence that has been provided in the specification and the attached Declaration, applicant respectfully maintains that the presently claimed invention is patentable over the cited prior art and therefore requests reconsideration and allowance of the present application.

Should the Examiner wish to discuss any aspect of the present application, she is invited to contact the undersigned attorney at the number provided below.

Respectfully submitted,

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